

REMARKS

Claims 1-29 are pending in the application, and claim 27 has been withdrawn. With entry of the present Response, claim 1 is currently amended, claim 30 is new, and no claims are cancelled.

Amendments to the Specification

The paragraph bridging pages 11 and 12 has been amended to correct a typographical error in line 30 that caused the referenced U.S. patent 5,376,255 to be listed twice; the second time with an extra number inserted. The second listing has been replaced with patent number “6,440,296” to indicate the status of the prior art. A similar error appeared in the paragraph at page 19, lines 20-22. This error was also corrected as above. Since these corrections are in the discussion of the prior art, no new matter has been added by these corrective amendments.

Additionally, the unnecessary word “have” was deleted from line 21. No new matter has been added by the correction.

Amendments to the Claims

Claim 1 has been amended to clarify that the transducer is contained by the confinement structure. Support for the amendment may be found throughout the application, and specifically on page 18, lines 7-8 and FIG. 3. Claim 1 has also been amended to include the additional limitation that the first synthetic polymer is trapped in the confinement structure to prevent peeling of the first synthetic polymer from the substrate. Support for this limitation may be found on page 3, lines 19-21, which discloses that the sensor of the instant claims addresses the problem of polymers peeling from their substrate, in combination with page 15, line 22, which discloses that the MIP is trapped inside the containment structure.

Independent claim 30 has been added, which includes a limitation that the sensor is arranged to carry out a differential measurement between the first confinement structure and the at least one additional confinement structure. Support for this claim

may be found throughout the specification, in the claims as originally filed, specifically on page 18, lines 25-30 and page 19, lines 2-3.

Rejection under 35 U.S.C. § 102(b)

Independent claims 1 and 25 stand rejected as being anticipated by Williams (US 2003/0053935 A1). The Applicants respectfully submit that, as amended, this rejection is without merit.

Claim 1 of the present application is generally directed to a sensor having a confinement structure comprising at least a first limiting structure defining an interior space. It is submitted that in order for a structure to be a “confinement structure,” it must be able to confine something; i.e., keep it in its place. Also, for a space to become “interior” it must be surrounded by the limiting structure, as there has to be a clear demarcation from the exterior for a space to become “interior.” It is noted that in the context of the present invention, the purpose of the confinement structure is to protect the synthetic polymer from peeling from the substrate surface. See Specification, page 3, lines 19-21; Specification, page 15, line 22.

Williams does not disclose a confinement structure having an interior space, as the electrical contact pads **91** and **93** border a rectangular shaped semiconductive polymer film **84** on two sides only, such that the semiconductive polymer film **84** is not confined in an interior space. See Williams, Figs. 5-6; Williams, page 3, para. [0037] and [0039]. In fact, the Williams sensor would necessarily suffer from the aforementioned peeling problems due to the fact that two of the sides of the rectangular shaped semiconductive polymer film **84** are exposed.

Moreover, in Williams, the contact pads **91** and **93** act to generate electric current through the semiconductive polymer film **84**, which can be used to measure the resistance of said film. Therefore, even assuming for the sake of argument that Williams teaches a confinement structure, Williams does not teach a transducer, and it does not teach a transducer proximal to the first interior space because the contact pads **91** and **93** define the first interior space. It is noted for the sake of completeness that reference numeral **82**, alleged to disclose a transducer, in fact refers to the sensor as a whole.

However, in order to more clearly delimit claim 1 from Williams, claim 1 has been amended by clarifying that the transducer is contained by the confinement structure. Specification, page 18, lines 7-8; See FIG. 3. This amendment makes it clear that the confinement structure and the transducer are different structures, and further, that the transducer is contained within the confinement structure. In contrast, Williams discloses contact pads **91** and **93** of the resistive sensor, and **101** and **103** of the molecular imprinted resistive sensor, that border but do not enclose their respective resistive sensors. Williams, Fig. 5 and paragraphs [0039]-[0040]. Therefore, the sensing mechanism of Williams is not confined.

To anticipate a claim, a prior art reference must teach every element of that claim. MPEP § 2131. In this case, however, Williams fails to disclose a confined sensor. Because Williams does not disclose or suggest every limitation of the instant claims, independent claim 1 and claim 25 are patentably distinguishable and allowable over the Williams publication. It is therefore respectfully requested that the rejection under § 102(b) be withdrawn.

Rejection (1) under 35 U.S.C. § 103(a)

Independent claims 1 and 25 stand rejected under 35 U.S.C. 103(a) as being anticipated by Gumbrecht in view of Blanco-López. On page 9 of the Office Action, the examiner submits it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate synthetic polymers (MIPs) on the electrochemical sensor surface, as taught by Blanco-Lopez, into the sensor of Gumbrecht in order to detect analytes using tailor-made highly selective artificial receptors. The examiner further states one of ordinary skill in the art would have had a reasonable expectation of success in combining teachings of Gumbrecht and Blanco-López since Blanco-López teaches that MIPs can be incorporated into a variety of electrochemical sensors. The Applicants respectfully submit that this argument fails to recognize three important distinctions.

First, the nature of the problem to be solved must be appreciated in light of the amendments to claim 1. In light to the discussion during the interview of March 5, 2010 pertaining to the obviousness rejections, claim 1 has been amended to include a limitation

that the first synthetic polymer is trapped in the confinement structure to prevent peeling of the first synthetic polymer from the substrate. See Specification, page 3, lines 19-21. Blanco-López and Gumbrecht, however, are completely silent utilizing a confinement structure to provide protection against such peeling. To the contrary, Gumbrecht is directed towards solving the problem of leaking fluid that can short-circuit a sensor. See Office Action of December 9, 2009, p. 7, lines 1-3. Likewise, there is nothing in Blanco-López that teaches that the problem of a synthetic polymer peeling from the substrate can be solved by deposition of that synthetic polymer within a confinement structure. Therefore, the person of ordinary skill in the art trying to overcome the peeling problem associated with MIP-based sensors would have no reasonable expectation of success when considering the combined teachings of Gumbrecht and Blanco-López.

Claim 1, as amended, contains a structural limitation directed towards solving a particular problem. Applicants submit that a person of ordinary skill would not be motivated to combine the teachings of Gumbrecht and Blanco-López to solve this particular problem and would have no reasonable expectation of success from such a combination.

Second, Blanco-López teaches a number of MIP deposition techniques in Table 5, all of which are incompatible with the type of sensor disclosed by Gumbrecht. In particular:

- Spin-coating is a contact-based deposition technique that requires a substantially planar surface and that requires the removal of excess polymer, usually by means of photolithography. The skilled person would understand that spin-coating cannot be used for a substrate carrying a confinement structure, as the deposition would damage the confinement structure, and it would not be apparent how only the confinement structure could be filled with the synthetic polymer.
- Silanization requires a metallic substrate, and requires the whole substrate to be soaked and immersed in respective precursor solutions. The skilled person would understand that this technique is incompatible with a sensor arrangement that requires a selective deposition.

- The sandwich technique is also incompatible with the Gumbrecht sensor as it is not possible to contact the transducer with the quartz disk(s) due to the fact that the transducer is confined by the confinement structure.

Therefore, one skilled in the art would not be inclined to combine the teachings of Gumbrecht and Blanco-López because the MIP deposition techniques taught by Blanco-López would render Gumbrecht unsatisfactory for its sensing purpose.

Even if the skilled person tried to apply the teachings of Blanco-López to the sensor of Gumbrecht, he or she would not be aware of how the synthetic polymer could be formed inside the confinement structure, nor would the skilled person be encouraged to fill the whole inner space rather than just covering the transducer area with the synthetic polymer. If a proposed modification renders the primary reference unsatisfactory for its intended purpose, then there is no suggestion or motivation to combine the references and a prima facie case of obviousness has not been established. See MPEP, § 2143.01, Part V.

Third, the combination of Gumbrecht and Blanco-López teaches away from the rationale underlying the present invention: to prevent the polymer from peeling from the surface of the substrate by enclosing it in a confinement structure. If a skilled person were to apply the silanization and sandwich deposition techniques taught by Blanco-López, only the transducer surface would be covered by the polymer. As such, it would still be susceptible to peeling as the edges of the polymer are not protected by the confinement structure. Similarly, the photografting technique taught by Blanco-López yields a polymer that only covers the transducer surface, such that it would still be susceptible to peeling as the edges of the polymer are not protected by the confinement structure. Furthermore, it would not be apparent to the skilled person that it would be unnecessary to remove the excess polymer inside the confinement because there is, in fact, is a surprising and unexpected benefit in not removing the excess (i.e. the protection against peeling). A prior art reference that teaches away from the claimed invention is a significant factor in favor of non-obviousness. MPEP, § 2145, Part X.D.1.

Hence, the Applicants submit that it would not be obvious for the person of ordinary skill in the art to combine the teachings of Gumbrecht and Blanco-López as:

- a) there is no expectation of reasonable chance of successfully solving the problem of polymer peeling;
- b) the teachings of Gumbrecht and Blanco-López are incompatible, as previously explained; and
- c) Blanco-López teaches away from its use in the inventions of the instant claims.

For at least these reasons, Applicants respectfully submit that claims 1-2, 14, 16 and 20-25, as amended, would not have been obvious in light of the cited references.

Rejection (2) under 35 U.S.C. § 103(a)

Claims 13, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gumbrecht in view of Blanco-López, and in further view of Leyland-Jones (U.S. Patent Publication No. 2003/0053950).

The deficiencies of combining the teachings of Gumbrecht with Blanco-López are detailed above, and the Applicants have submitted that claims 1 (as amended) and 25 are nonobvious and allowable. Since claims 13, 28 and 29 derive their allowability from the independent claims 1 and 25, and because the rejection of these claims relies on the improper combination of Gumbrecht with Blanco-López, the Applicants submit that, for at least these reasons, claims 13, 28 and 29 would not have been obvious in light of the cited references.

Rejection (3) under 35 U.S.C. § 103(a)

The examiner has rejected pending claim 15 as being obvious over Gumbrecht in view of Blanco-López and in further view of Ulbricht. The deficiencies in basing an obviousness rejection on Gumbrecht in view of Blanco-López are discussed above. There is nothing in Ulbricht to cure these deficiencies.

It is respectfully submitted that Ulbricht does not teach the use of a sensor comprised of a reference material within an additional confinement structure on said sensor, as required by claim 15. Ulbricht merely teaches the comparison with a separate non-imprinted reference sample. In other words, Ulbricht does not teach the benefit of an “in-sensor” reference material that can be used to calibrate the binding to a MIP exposed

to the same sample. See specification, page 18, lines 25-26. Its non-imprinted reference samples are completely separate from its imprinted polymer membranes.

As such, even if a skilled person were able to apply the teachings of the cited prior art in further view of Ulbricht, as alleged by the Examiner, he or she would not arrive at the claimed invention. In other words, because claim 15 depends from claim 1, as amended (via claim 11) and because the combined teachings of Gumbrecht, Blanco-López and Ulbricht fail to arrive at claim 1, the mere fact that Ulbricht discloses a reference material does not suffice to encompass claim 15 inclusive of all its limitations.

For at least this reason, Applicants respectfully submit that claim 15 would not have been obvious in light of the cited references.

Rejection (4) under 35 U.S.C. § 103(a)

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gumbrecht in view of Blanco-López, as applied to claim 1, and in further view of Dickert et al. (U.S. Patent No. 6,223,589).

The deficiencies of combining the teachings of Gumbrecht with Blanco-López are detailed above, and the Applicants have submitted that claim 1, as amended, is nonobvious and allowable. Since claims 18 and 19 derive their allowability from claim 1 as amended, and because the rejection of these claims relies on the improper combination of Gumbrecht with Blanco-López, the Applicants submit that, for at least this reason, claims 18 and 19 would not have been obvious in light of the cited references.

Rejection (5) under 35 U.S.C. § 103(a)

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gumbrecht in view of Blanco-López, as applied to claims 1 and 25, and in further view of Dieffenbach et al. (U.S. Patent No. 5,089,421).

The deficiencies of combining the teachings of Gumbrecht with Blanco-López are detailed above, and the Applicants have submitted that claims 1 and 25 are nonobvious and allowable. Since claim 26 derives its allowability from claim 1 as amended, and because the rejection of this claim relies on the improper combination of

Gumbrecht with Blanco-López, the Applicants submit that, for at least this reason, claim 26 would not have been obvious in light of the cited references.

CONCLUSION

Applicants believe that no extension to time is required for submission of this response. In the event that an extension is needed, this conditional petition of extension is hereby submitted. Applicants request that deposit account number 19-4972 be charged for any fees that may be required for the timely consideration of this application.

It is submitted that all of the pending claims are now in a condition for allowance, and Applicants respectfully request reconsideration of the application and issuance of a notice of allowance. The Examiner is requested to telephone the undersigned if any matters remain outstanding so that they may be resolved expeditiously.

March 9, 2010

Respectfully submitted,

/Justin P. Huddleson, #64,445/
Justin P. Huddleson
Registration No. 64,445
Attorney for Applicants

SUNSTEIN KANN MURPHY & TIMBERS LLP
125 Summer Street
Boston, MA 02110-1618
Tel: (617) 443-9292
Fax: (617) 443-0004

2497A/00109 1223324.1